

AMENDMENTS TO THE SPECIFICATION

Please amend the Title of the Specification as follows:

TONE CONTROL APPARATUS AND TONE CONTROL METHOD

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A tone control apparatus which constitutes a tone control filter having a desired characteristic by inputting a fixed filter factor into said tone control filter, and which adjusts a sound signal by making the sound signal pass through said tone control filter, ~~characterized in that~~ said tone control apparatus comprises:

a smoothing means for smoothing a Fourier spectrum of a desired filter response;

a cepstrum calculating means for calculating a cepstrum from the Fourier spectrum smoothed by said smoothing means; and

a filter factor calculating means for calculating said filter factor based on the cepstrum calculated by said cepstrum calculating means,

wherein said filter factor calculating means and said tone control filter are independently formed by calculating said fixed filter factor prior to inputting the sound signal to the tone control filter.

2. (Canceled)

3. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that~~ wherein said apparatus includes a means for allowing a change of the desired filter response and for updating said filter factor successively according to said change of the desired filter response while the sound signal is inputted into the tone control filter.

4. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that~~ wherein said apparatus includes a means for determining the desired filter response based on a result of analysis of the sound signal while the sound signal is inputted into the tone control filter.

5. (Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that~~ wherein said apparatus includes a means for smoothing the Fourier spectrum by filtering a series of sampled values of the Fourier spectrum with a low pass filter.

6. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that wherein~~ said apparatus includes a means for smoothing the Fourier spectrum by replacing each odd or even-numbered sampled value of the Fourier spectrum with an average of sampled values adjacent to each odd or even-numbered sampled value.

7. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that wherein~~ said apparatus includes a means for detecting a change point of the Fourier spectrum of the desired filter response, which changes steeply, and for smoothing a certain range of the Fourier spectrum with its center being at the change point.

8. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that wherein~~ the tone control filter is a log magnitude approximation filter, and the cepstrum is set as the filter factor of the tone control filter.

9. (Withdrawn - Currently Amended) The tone control apparatus according to Claim 1, ~~characterized in that wherein~~ the tone control filter is an IIR filter, and a linear prediction coefficient to which the cepstrum is converted is set as the filter factor of the tone control filter.

10. (New) The tone control apparatus according to Claim 1, wherein said smoothing means is utilized for smoothing a power spectrum of a desired filter response; and

 said cepstrum calculating means calculates a cepstrum from the power spectrum smoothed by said smoothing means.

11. (New) The tone control apparatus according to Claim 1, wherein said smoothing means is utilized for smoothing a log square magnitude spectrum of a desired filter response; and
 said cepstrum calculating means calculates a cepstrum from the log square magnitude spectrum smoothed by said smoothing means.

12. (New) A tone control method for inputting a filter factor into a tone control filter, and adjusting a sound signal by making the sound signal pass through said tone control filter, said tone control method comprises:

smoothing a Fourier spectrum of a desired filter response;

calculating a cepstrum from the smoothed Fourier spectrum; and

calculating said filter factor based on the calculated cepstrum prior to inputting the sound signal to the tone control filter, wherein said tone control factor is a fixed filter factor.

13. (New - Withdrawn) The tone control method according to Claim 12, further comprising: allowing a change of the desired filter response and updating said filter factor successively according to said change of the desired filter response while the sound signal is inputted into the tone control filter.

14. (New - Withdrawn) The tone control method according to Claim 12, further comprising: determining the desired filter response based on a result of analysis of the sound signal while the sound signal is inputted into the tone control filter.

15. (New) The tone control method according to Claim 12, further comprising smoothing the Fourier spectrum by filtering a series of sampled values of the Fourier spectrum with a low pass filter.

16. (New - Withdrawn) The tone control method according to Claim 12, further comprising smoothing the Fourier spectrum by replacing each odd or even-numbered sampled value of the Fourier spectrum with an average of sampled values adjacent to each odd or even-numbered sampled value.

17. (New - Withdrawn) The tone control method according to Claim 12, further comprising detecting a change point of the Fourier spectrum of the desired filter response, which changes steeply, and smoothing a certain range of the Fourier spectrum with its center being at the change point.

18. (New - Withdrawn) The tone control method according to Claim 12, wherein the tone control filter is a log magnitude approximation filter, and the cepstrum is set as the filter factor of the tone control filter.

19. (New - Withdrawn) The tone control method according to Claim 12, wherein the tone control filter is an IIR filter, and a linear prediction coefficient to which the cepstrum is converted is set as the filter factor of the tone control filter.

20. (New) The tone control method according to Claim 12, further comprising:
smoothing a power spectrum of a desired filter response; and
calculating a cepstrum from the smoothed power spectrum.

21. (New) The tone control method according to Claim 12, further comprising:
smoothing a log square magnitude spectrum of a desired filter response; and
calculating a cepstrum from the smoothed log square magnitude spectrum.